

Serial No. 10/643,961
January 12, 2005
Reply to the Office Action dated November 15, 2004
Page 2 of 14

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

Claim 1 (previously presented): A process for manufacturing an integrated circuit package comprising:

mounting a semiconductor die to a first surface of a substrate;

mounting a die adapter to said semiconductor die;

wire bonding said semiconductor die to ones of conductive traces of said substrate;

mounting at least one collapsible spacer to at least one of a heat spreader, said die adapter and said substrate;

placing one of said heat spreader and said substrate on a surface of a lower mold die;

releasably clamping the other of said heat spreader and said substrate to an upper mold die, such that said collapsible spacer is disposed between said heat spreader and said substrate;

molding the semiconductor die, the substrate, the wire bonds, said die adapter, said at least one collapsible spacer and said heat spreader into a molding compound by molding in a mold cavity between said other of said heat spreader and said substrate and said surface of the lower mold die, to provide a molded package;

forming a ball grid array on a second surface of said substrate, bumps of said ball grid array being electrically connected to said conductive traces; and singulating said integrated circuit package.

Claim 2 (previously presented): The process according to claim 1, wherein said placing one of said heat spreader and said substrate in the mold cavity comprises

Serial No. 10/643,961
January 12, 2005
Reply to the Office Action dated November 15, 2004
Page 3 of 14

placing said heat spreader in said mold cavity such that said heat spreader rests on said surface of said lower mold die.

Claim 3 (previously presented): The process according to claim 2, wherein said releasably clamping comprises releasably clamping said substrate to said upper mold die.

Claim 4 (previously presented): The process according to claim 1, wherein said placing one of said heat spreader and said substrate on a surface of a lower mold die comprises placing said substrate in said mold cavity such that said substrate rests on said surface of said lower mold die.

Claim 5 (previously presented): The process according to claim 4, wherein said releasably clamping comprises releasably clamping said heat spreader to said upper mold die.

Claim 6 (original): The process according to claim 1, wherein said wire bonding further comprises ground wire bonding said semiconductor die to said die adapter.

Claim 7 (previously presented): The process according to claim 1, wherein said wire bonding further comprises ground wire bonding said semiconductor die to at least one ground pad on said substrate.

Claim 8 (original): The process according to claim 1, wherein said mounting at least one collapsible spacer comprises mounting said at least one collapsible spacer to said substrate.

Claim 9 (original): The process according to claim 1, wherein said mounting at

Serial No. 10/643,961
January 12, 2005
Reply to the Office Action dated November 15, 2004
Page 4 of 14

least one collapsible spacer comprises mounting said at least one collapsible spacer to said heat spreader.

Claim 10 (original): The process according to claim 1, wherein said at least one collapsible spacer comprises a plurality of collapsible spacers, and mounting said at least one collapsible spacer comprises mounting one of said plurality of collapsible spacers to said die adapter and mounting at least another of said collapsible spacers to said substrate.

Claim 11 (previously presented): The process according to claim 10, wherein said one of said plurality of collapsible spacers is disposed between said die adapter and said heat spreader and in contact with said die adapter and said heat spreader during molding.

Claim 12 (original): The process according to claim 10, wherein said at least another of said collapsible spacers is disposed in contact with said heat spreader during molding.

Claim 13 (previously presented): A process for manufacturing a plurality of integrated circuit packages comprising:

- mounting a plurality of semiconductor dice to a first surface of a substrate array;
- mounting a plurality of die adapters to said semiconductor dice such that each one of said die adapters is mounted to a corresponding one of said semiconductor dice;
- wire bonding said semiconductor dice to ones of conductive traces of said substrate array;
- mounting a collapsible spacer array to one of a heat spreader array and said substrate array;
- placing one of said heat spreader array and said substrate array on a surface of

Serial No. 10/643,961
January 12, 2005
Reply to the Office Action dated November 15, 2004
Page 5 of 14

a lower mold die;

releasably clamping the other of said heat spreader array and said substrate array to an upper mold die such that said collapsible spacer array is disposed between said heat spreader array and said substrate array;

molding the semiconductor dice, said substrate array, said wire bonds, said die adapters, said collapsible spacer array and said heat spreader array into a molding compound by molding in a mold cavity between said other of said heat spreader array and said substrate array and said surface of the lower mold die, to provide an array of molded packages;

forming a plurality of ball grid arrays on a second surface of said substrate array, bumps of said ball grid arrays being electrically connected to said conductive traces; and

singulating each integrated circuit package from said array of molded packages.

Claim 14 (previously presented): The process according to claim 13, wherein said placing one of said heat spreader array and said substrate array on the surface of the lower mold die comprises placing said heat spreader array in said mold cavity such that said heat spreader array rests on said surface of said lower mold die.

Claim 15 (previously presented): The process according to claim 14, wherein said releasably clamping comprises releasably clamping said substrate array to the upper mold die.

Claim 16 (previously presented): The process according to claim 13, wherein said placing one of said heat spreader array and said substrate array on surface of the lower mold die comprises placing said substrate array in said mold cavity such that said substrate array rests on said surface of said lower mold die.

Serial No. 10/643,961
January 12, 2005
Reply to the Office Action dated November 15, 2004
Page 6 of 14

Claim 17 (previously presented): The process according to claim 16, wherein said releasably clamping, comprises releasably clamping said heat spreader array to the upper mold die.

Claim 18 (original): The process according to claim 13, wherein said wire bonding further comprises ground wire bonding each of said die adapters to said corresponding one of said semiconductor dice.

Claim 19 (previously presented): The process according to claim 13, wherein said wire bonding further comprises ground wire bonding each of said semiconductor dice to a corresponding ground pad on said substrate array.

Claim 20 (original): The process according to claim 13, wherein said mounting said collapsible spacer array comprises mounting said collapsible spacer array to said substrate array.

Claim 21 (original): The process according to claim 13, wherein said mounting said collapsible spacer array comprises mounting said collapsible spacer array to said heat spreader array.

Claim 22 (original): The process according to claim 19, wherein mounting said collapsible spacer array further comprises mounting a corresponding collapsible spacer of said collapsible spacer array to each of said plurality of die adapters.

Claim 23 (previously presented): The process according to claim 22, wherein said collapsible spacer array is disposed between said die adapters and said heat spreader array and in contact with said die adapters and heat spreader array during molding.

Serial No. 10/643,961
January 12, 2005
Reply to the Office Action dated November 15, 2004
Page 7 of 14

Claims 24-29 (canceled).